Department for Business, Energy & Industrial Strategy

# National Energy Efficiency Data-Framework (NEED): Summary of Analysis, Great Britain, 2020

25 June 2020 **National Statistics**

This report summarises analysis of domestic energy consumption using the latest version of the National Energy Efficiency Data-Framework (NEED).

- The pattern of average consumption by household and property attributes remains broadly stable over time. Average consumption tends to be lower for newer and smaller properties.

- The estimated median reduction in gas consumption resulting from energy efficiency measures installed in 2017 ranges from 4.2 per cent for loft insulation to 18.9 per cent for solid wall insulation. Solar PV results in a median reduction of 12.6 per cent in electricity consumption (see chart below).

- The energy savings in the years after installation of energy efficiency measures is also estimated. Regarding savings in gas consumption resulting from installations in 2011, Condensing boiler and loft insulation saw the largest declines, both seeing a reduction in gas savings of just over a fifth between the first and seventh years after installation.

Median and mean gas savings in 2018 for measures installed in 2017, England and Wales (savings are for electricity for Solar PV)
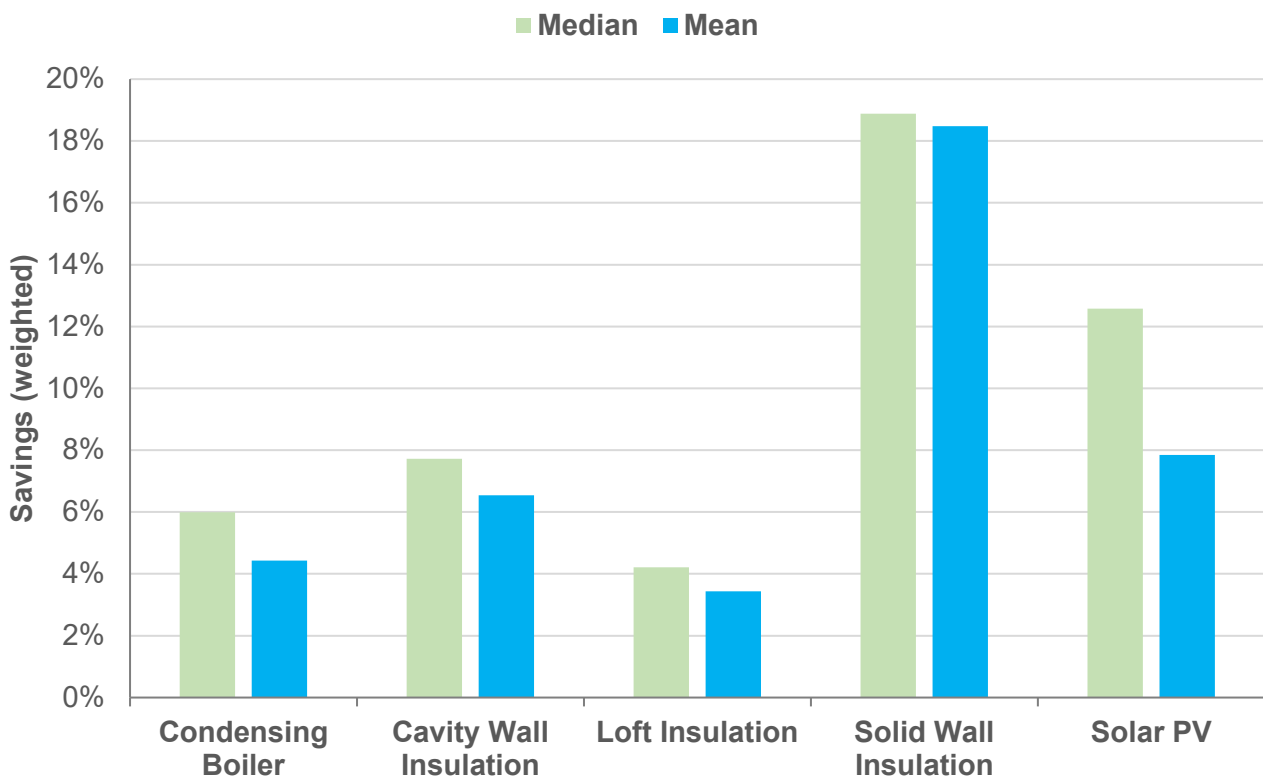
What you need to know about this report

The article "What is NEED?"[1] provides an introductory overview of the NEED framework. All accompanying tables are published alongside this report[2]. This includes a 'table generator' which allows users to create custom comparisons of consumption statistics.

Note that "2018" refers to mid May 2018 – mid May 2019 for gas consumption, and late January 2018 – late January 2019 for electricity consumption.

Analysis for the current NEED dataset is based on 22.7m properties in England and Wales for electricity and 18.2m for gas. Estimates for Scotland are based on 2.1m properties for electricity and 1.6m for gas.

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[1] "What is NEED?" can be found here:
www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2018
[2] Summary statistics on gas and electricity consumption can be found here:
www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-consumption-data-tables-2020
Summary statistics of the impact of energy efficiency measures can be found here:
www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-impact-of-measure-data-tables-2020

Contents

1. Introduction

This report presents the headline results and key findings of the analysis carried out and tables created using the latest version of domestic NEED. Chapter 2 presents evidence of how domestic gas and electricity consumption varies by different property and household characteristics. Chapter 3 presents estimates of the average impact on energy consumption resulting from different energy efficiency measures. This includes estimates for single and combinations of measures installed in a property as well as comparisons of how saving from an energy efficiency measure change over time. The NEED report would normally also report on changes in consumption arising from the installation of measures, broken down by different property and household characteristics. However, it has not been possible to produce this analysis for this publication and these estimates will be released later this year.

Detailed tables, including breakdowns of consumption by property attributes and household characteristics, and estimates for the impacts of installing different energy efficiency measures, are published alongside this report (see Annex B for details of all published tables). In addition to these tables, two annexes and an updated NEED methodology note have been published alongside this report:

- **Annex A: Comparison with Other Sources** – gives a summary of the data sources used in NEED and provides an assessment of this against other sources.

- **Annex B: Overview of Data Tables** - gives a summary list of all the published tables.

The domestic NEED methodology note[3] published alongside this publication includes details of how estimates of domestic electricity and gas consumption by property attributes and household characteristics are produced. It also sets out the methodology for estimating the saving in gas consumption following the installation of retrofit energy efficiency measures (e.g. cavity wall insulation, loft insulation).

Uses of the data

This data framework uniquely provides meter consumption estimates linked to other data sources for 23.8m properties in England and Wales and 2.2m properties in Scotland. Combined with a range of demographic and property data, it can provide insight on factors affecting household energy consumption and the consumption savings resulting from installation of government supported energy efficiency measures. As such, it is key part of the evidence base supporting BEIS to develop, monitor and evaluate energy policies.

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[3] The methodology note can be found here:
www.gov.uk/government/publications/domestic-national-energy-efficiency-data-framework-need-methodology

Temporal coverage of the data

The latest data in this report relate to 2018. The precise time periods covered by different years of data differ for gas and electricity consumption.

The summer of 2017 saw the implementation of new gas meter point management and settlement processes, which caused a change in the period of gas consumption covered by the 2016 data. Furthermore, with the 2016 consumption figures, Xoserve introduced a new data collection system. Due to this, a large proportion of meters which had not reported for some time had their Annual Quantities (AQs) updated in the 2017 gas consumption figures. This large update led to an increase in the total gas consumption reported in 2017. With the majority of gas meters now providing timely meter readings, the figures from 2017 onwards are a truer reflection of gas consumption. Further details are contained in the subnational consumption publication and the NEED Methodology.

The gas consumption periods each year refers to are:

- Prior to 2014: October – September (same period as 2014 and 2015)
- 2014: October 2013 – September 2014
- 2015: October 2014 – September 2015
- 2016: mid July 2016 – mid July 2017
- 2017: mid June 2017 – mid June 2018
- 2018: mid May 2018 – mid May 2019

For this report and all accompanying annexes and tables, where gas consumption is referred to in a particular year, this relates to the "gas period" set out above, rather than the "gas year" or calendar year.

For electricity consumption the time period is late January – late January. For example "2018" covers late January 2018 to late January 2019.

Summary of data sources

The data sources which contribute to NEED are listed below:

- Gas meters (source: Xoserve)
- Electricity meters (source: electricity data aggregators)
- Property characteristics (source: Valuation Office Agency and Scottish Assessors)
- Household characteristics (source: Experian)
- Boiler installs (source: Gas Safe register)
- Installation of energy efficiency measures (source: statistics from government schemes including the Energy Company Obligation, Green Deal, Feed-in Tariff, and others)

See the NEED Methodology document for further information.

Access to data

NEED provides a valuable resource and we recognise that there may be potential uses beyond the projects currently taking place. Information about how to access property level data is available at this link:
www.gov.uk/government/publications/national-energy-efficiency-data-framework-need-accessing-property-level-data

Samples of anonymised record level data were released in December 2019 and are available from this link:
www.gov.uk/government/collections/national-energy-efficiency-data-need-framework#record-level-data

To maximise the usefulness of future publications and to influence the work carried out by the NEED team in the future, please complete the 1 minute survey linked below:
www.surveymonkey.co.uk/r/WBDTPGF

2. Domestic energy consumption

This section presents an analysis of domestic gas and electricity consumption by property attributes and household characteristics.

The data included in this chapter can be found in the Headline Consumption Tables[4] published alongside this report. A full list of the property and household characteristics is given in Annex B: Overview of Data Tables.

The patterns in energy consumption by household and property characteristics tend to show little variation between years, other than following the general national trends in consumption. Therefore, this chapter describes a selection of the trends and does not draw on all of the published tables.

All the results for England and Wales are based on 22.7 million properties for electricity consumption and 18.2 million for gas consumption. Unlike publications prior to 2019, this year's analysis uses the full property database rather than a sample (up to and including the 2018 release roughly 4 million properties were included for electricity and roughly 3 million for gas[5]).

An analysis of consumption trends in Scotland is in a sub-section at the end of this chapter.

All consumption figures presented in this section are based on valid domestic gas and electricity consumption and are rounded to the nearest 100 kWh. As gas is predominantly a heating fuel its use depends heavily on the weather. Because of this, gas consumption for each household has been adjusted for differences in temperature and wind speed in each year ("weather correction"). This allows for a consistent comparison of gas consumption over time. As electricity is used for a much wider variety of reasons (and far less often as a heating fuel) consumption is less affected by the weather, so this data is not temperature corrected.

Extreme weather events

The weather correction process used assumes a brief lag between changes in weather and the average consumer's change in heating behaviour. This assumption generally results in good performance of the weather correction process, however in extreme weather events, such as those seen in the UK in February and March 2018, the rapid drop in temperatures mean that the weather correction process may not have fully compensated for the lower temperatures for those days. This means that a "truly" weather corrected figure for the 2017 gas period could be slightly lower than that reported.

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[4] Consumption tables can be found here: www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-consumption-data-tables-2020
[5] This is due to the property characteristic data supplied by the Valuation Office Agency now being held by BEIS, removing the need to create a sample

There is a strong positive relationship between certain characteristics and a household's energy use (for example, size of property). This section provides insight into how each individual characteristic relates to energy use but makes no attempt to control for relationships between characteristics in the dataset or with other characteristics not captured by this data. Energy consumption in England and Wales.

A break in the time series

Gas meter readings are received by BEIS from Xoserve, who compile these data from gas shippers who receive the data from gas suppliers. If any meter reading does not progress through one of these stages, then BEIS' record of the Annual Quantity (AQ) isn't updated and an existing AQ is used in the NEED figures.

With the 2016 consumption figures, Xoserve introduced a new data collection system. Due to this, a large proportion of meters which had not reported for some time have had their AQs updated in the 2016 gas consumption figures. This large update led to an increase in the total AQ reported in 2016 gas consumption. With the majority of gas meters now providing timely meter readings, the figures from 2016 onwards are a truer reflection of gas consumption.

Because some meters did not submit readings for multiple years prior to 2016, the figures for these years likely underestimate the total gas used. The figures for the years 2016 onwards are therefore not fully comparable to previous years.

Trends in domestic energy consumption

This section provides analysis of the trends in median gas and electricity consumption between 2005 and 2018 for selected property attributes and household characteristics.

Table 1: Annual consumption summary statistics for England and Wales 2018

						kWh
	N (million)	Mean	Standard Deviation	Lower quartile	Median	Upper quartile
Gas	18.2	13,200	7,600	8,100	12,000	16,900
Electric	22.7	3,700	2,900	1,900	3,000	4,500

Table 1 shows summary statistics for domestic gas and electricity consumption in England and Wales (note that electricity and gas consumption are presented on separate axis). The mean gas consumption is over three times that of electricity consumption. For a detailed breakdown of domestic gas and electricity consumption by different geographic areas (from local authority

to postcode) and annual trends for these please see the Sub-national consumption publication[6].

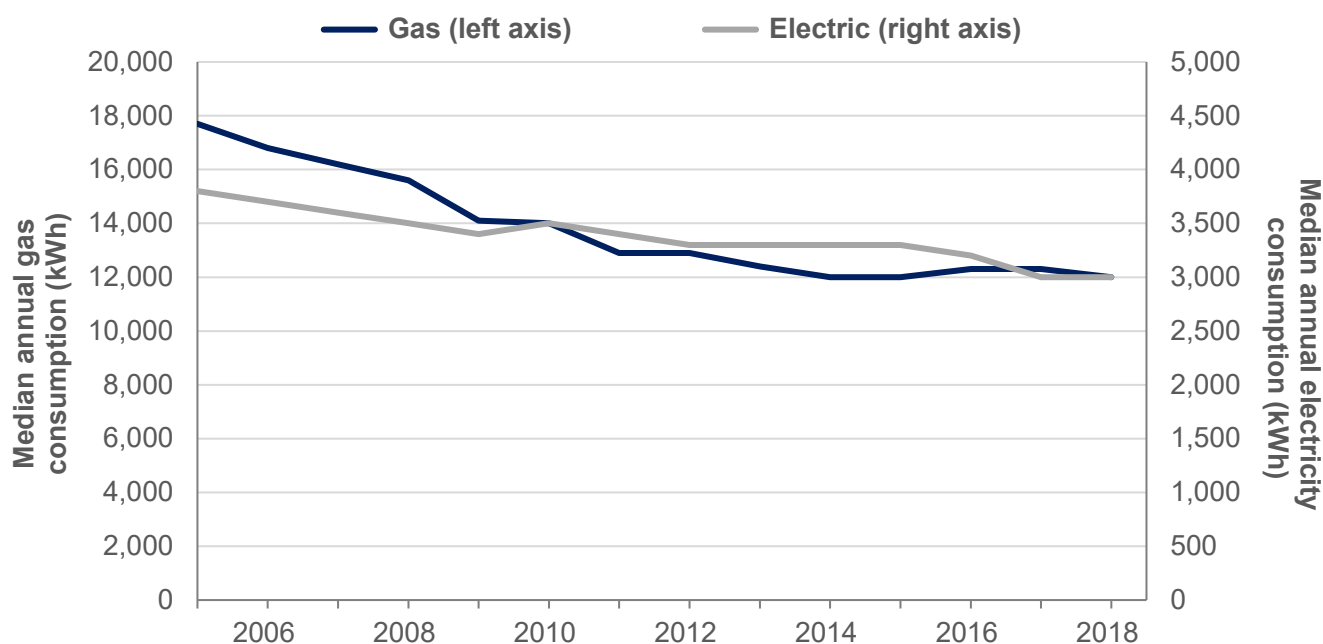**Figure 2.1: Trends in median annual domestic gas and electricity consumption (kWh)**

Figure 2.1 shows the median gas and electricity consumption for all households in the NEED sample with valid consumption in each year from 2005 to 2018. Data for 2005 to 2010 cover England only and later data (2011 onwards) cover both England & Wales. The median is a more appropriate measure of typical consumption than the mean because the mean can be influenced by a relatively small number of high-consuming households that are not typical of the rest of the population.

It can be seen from Figure 2.1 that median consumption for both gas and electricity has been generally declining since 2005. Median gas consumption fell more quickly between 2005 and 2011 (by 27 per cent) and has fallen by 7 per cent between 2012 and 2018. The decrease in median electricity consumption is steadier, falling by around a fifth (21 per cent) between 2005 and 2018 or 1.5 per cent per annum on average.

The fall in median consumption is seen consistently across all property types, household characteristics, geographies and socio-demographic classifications. However, certain households will have been affected to a greater or lesser extent by the different factors described above. The remainder of this section provides some highlights of changes over time for different property attributes and household characteristics.

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[6] Sub-national gas and electricity consumption statistics can be found at:
 www.gov.uk/government/collections/sub-national-gas-consumption-data
www.gov.uk/government/collections/sub-national-electricity-consumption-data

Trends in domestic consumption by property age

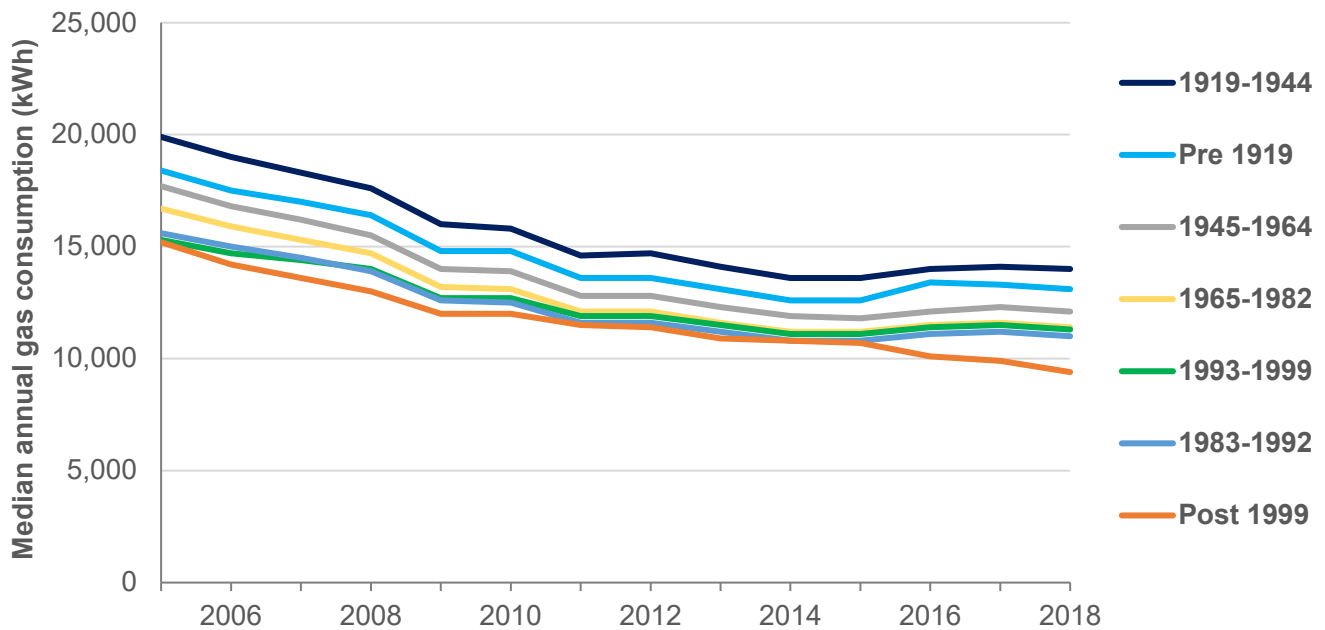## Figure 2.2: Median gas consumption over time by property age

Figure 2.2 shows that up until 2015, while there has been a general downward trend in gas consumption for properties of all property age groups, the trends have flattened for most property types since 2016. This coincides with when Xoserve modified its data collection process, as is outlined in the info-box on Page 8.

Properties built more recently (post-1999) consistently see lower gas consumption. These properties can be expected to be more energy efficient (for example, having higher quality insulation) because the building regulations have changed over time. This also suggests that as more properties are built, the more the median gas consumption will likely be reduced. This is because the proportion of the housing stock made up of newer properties is increasing with time, particularly for the 'post 1999' group.

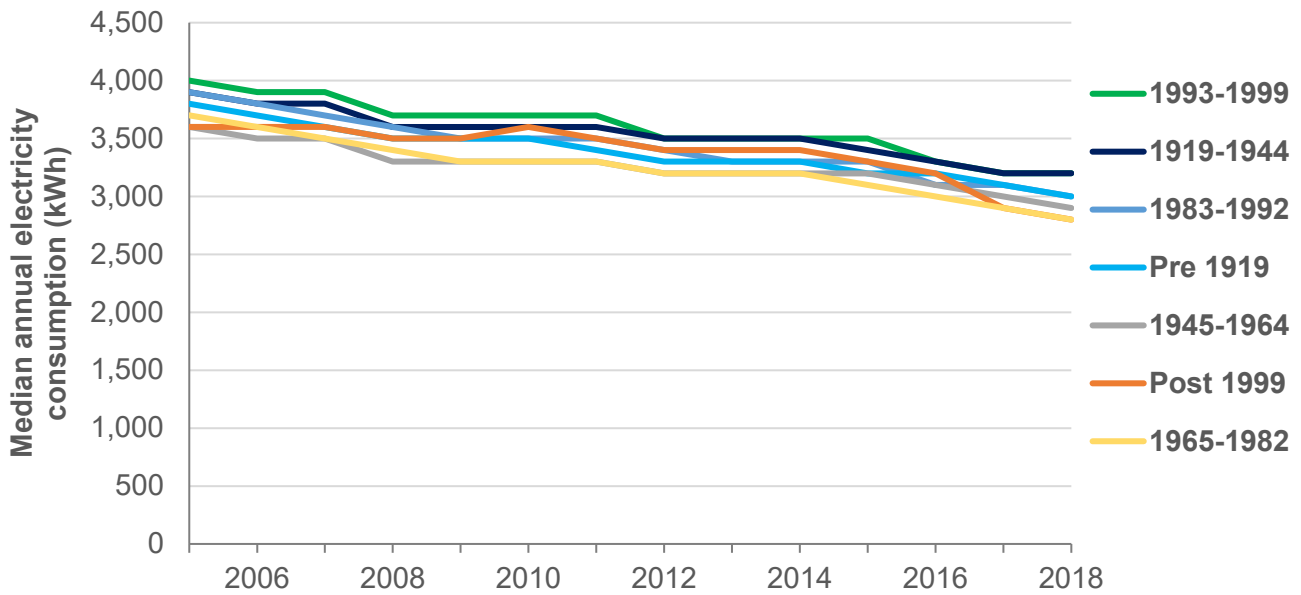**Figure 2.3: Median electricity consumption over time by property age**

Figure 2.3 shows that properties built between 1945 and 1982 can be seen to consistently consume less electricity, on average, than properties built in other periods. Electricity is used for a greater variety of activities than gas, which is used mainly to heat homes, meaning that the building regulations which newer properties abide by are likely to have a lesser impact on electricity consumption.

Trends in domestic consumption by property type

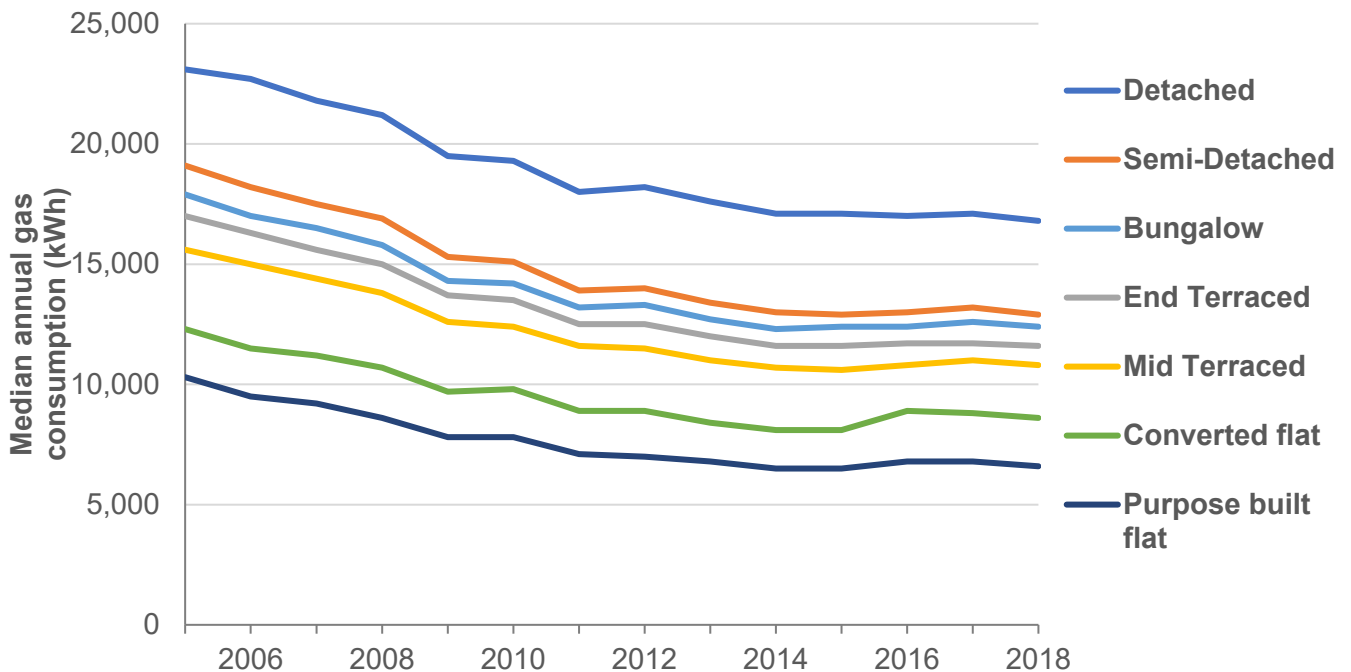**Figure 2.4: Median gas consumption over time by property type**

Figure 2.4 shows the trend in median gas consumption by property type. It demonstrates that between 2005 and 2014 the fall seen in gas consumption was evident among all property

11

types. Detached houses consistently use more gas than other property types, and flats, particularly purpose build flats, use the least.

Furthermore, smaller properties tend to show a greater percentage decrease in median consumption when compared with larger properties. For example, in 2018 typical gas consumption for purpose-built flats was 36 per cent lower than in 2005, but for detached dwellings this reduction was only 27 per cent. The mid-size property types (bungalows, semi-detached and terraced) all follow a similar decrease of 31 to 32 per cent.

A large proportion of converted flats in England and Wales are in dwellings originally built before 1919, putting them in the oldest age group held in NEED. As these properties are older, converted flats are generally less efficient than newer properties. This can be seen when comparing converted flats to purpose-built flats, where in 2018 converted flats had a median gas consumption 23 per cent higher than purpose-built flats, despite the fact that both property types tend to have similar sizes. Note that lower address matching rates tend to be achieved for flats compared to other property types which may affect the reliability of trends over time.

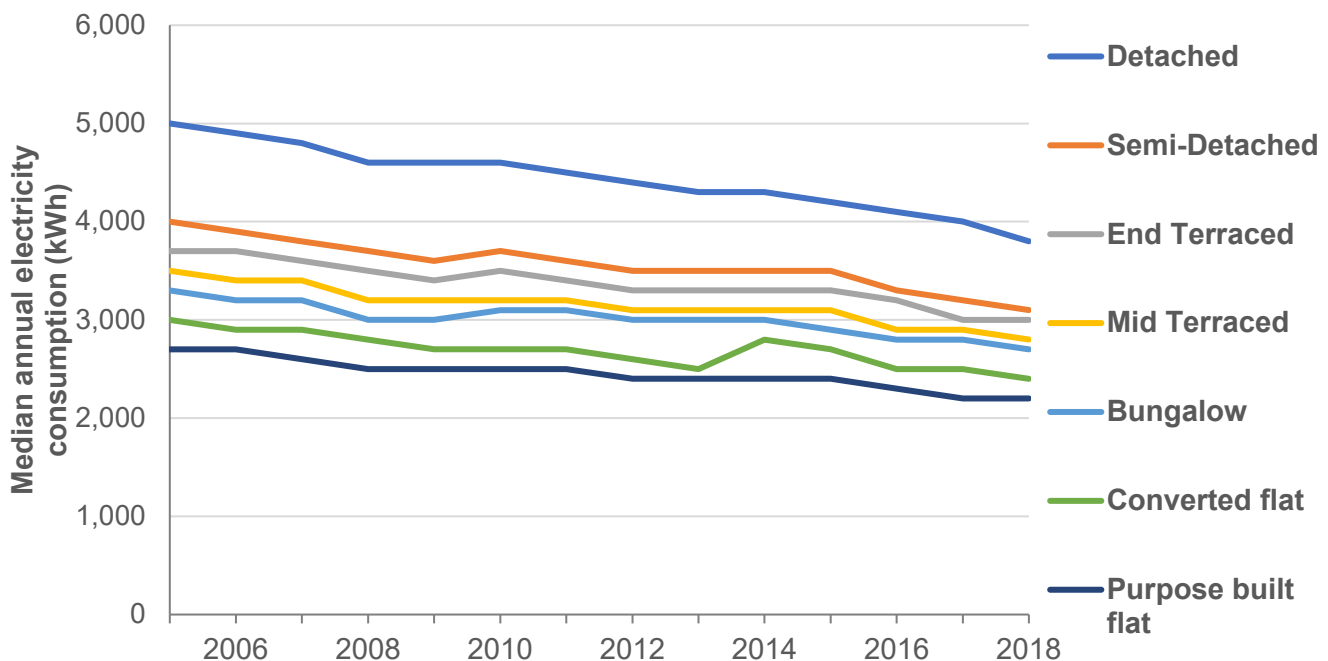**Figure 2.5: Median electricity consumption over time by property type**

Figure 2.5 shows that detached and semi-detached properties saw the largest decline in median electricity consumption between 2005 and 2018 (over 22 per cent) while bungalows (18 per cent) saw the smallest. This contrasts with changes in gas consumption where purpose-built flats saw the greatest percentage decrease.

The higher volatility in data shown in Figure 2.5 compared to Figure 2.4 likely reflects the fact that, unlike gas, the electricity consumption figures are not weather corrected. It is estimated that 14 per cent of properties are off the gas grid and use non gas fuel sources, including electricity to heat their homes[7].

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[7] Estimates of households not connected to the gas network:
www.gov.uk/government/statistics/sub-national-estimates-of-households-not-connected-to-the-gas-network

Trends in domestic consumption by household characteristics

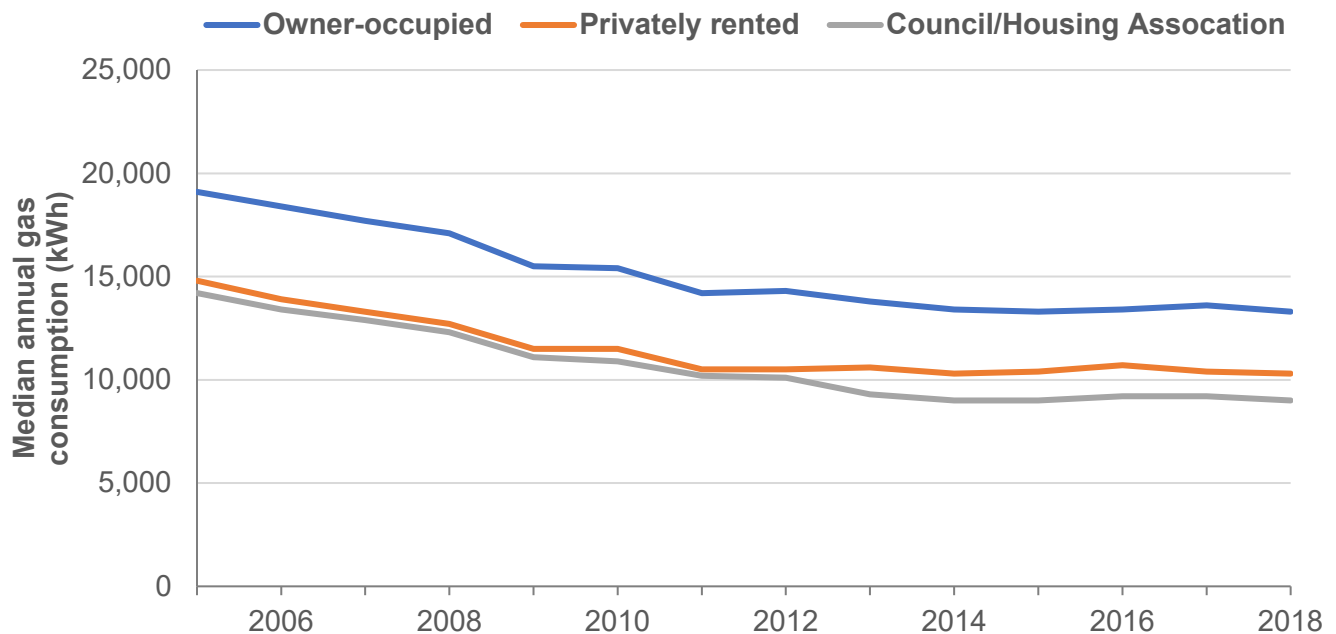### Figure 2.6 Median gas consumption over time by tenure

Figure 2.6 shows the trend in consumption of gas since 2005 split by tenure. Over this time social housing (council and housing association owned properties) has consistently had lower median consumption than other tenure groups, and exhibited a faster decline in consumption when compared to owner-occupied properties. Since 2012 the privately rented consumption trend has become uncoupled with council/housing association properties and more aligned with owner-occupied properties, although their median consumption remains more similar to social housing.

Energy consumption in Scotland

Modelled data from Experian have been used for most property attributes and household characteristics in this analysis. This is, with the exception of property type and floor area, where data from the Scottish Assessors (the organisation responsible for valuing properties in Scotland and which holds data on property characteristics in Scotland) are used.

Table 2: Annual consumption summary statistics for Scotland 2018

						kWh
	N (million)	Mean	Standard Deviation	Lower quartile	Median	Upper quartile
Gas	1.6	14,100	8,200	8,400	12,600	18,000
Electric	2.1	3,800	3,100	1,900	3,000	4,600

Users should be aware that while the data provided by the Scottish Assessors is considered accurate, the Scottish Assessors data held in NEED was last updated over 4 years ago. This means that properties built more recently than this have not been included in the analysis used for this report or in accompanying tables. Therefore, mean and median consumption figures given here could be overestimated, because newer properties tend to be more energy efficient. For a more accurate of median consumption between domestic properties see the local authority level Sub-national gas consumption publication[8].

In 2018, the median gas consumption for properties in Scotland was 12,600 kWh with median electricity consumption at 3,000 kWh. The equivalent figures for England & Wales are 12,000 kWh and 3,100 kWh respectively, showing that typical gas consumption in Scotland is 4.8 per cent higher than in England & Wales.

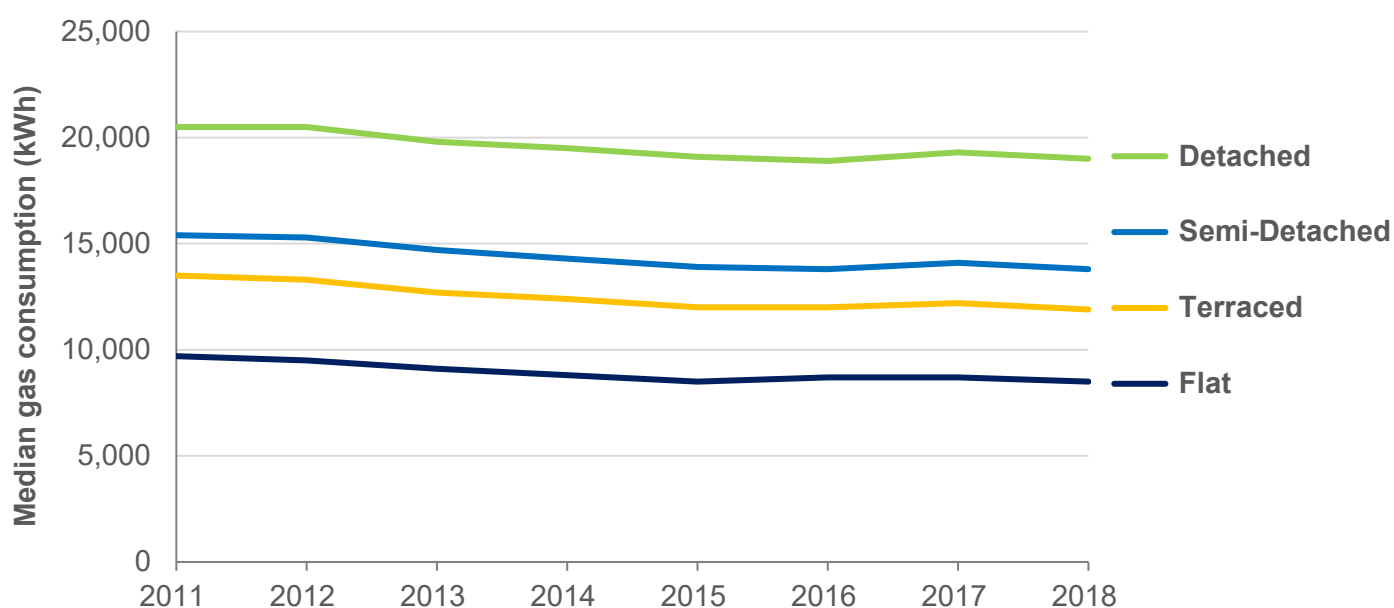**Figure 2.7: Median gas consumption over time by property type, in Scotland**

Figure 2.7 shows that gas consumption varies by property type as expected; detached dwellings have the highest median consumption, whilst flats have the lowest. Average consumption has declined for all property types over time. The overall decrease between 2011 and 2018 for all dwellings is 11 per cent. In England and Wales in the same time period the decrease was 7 per cent.

Tables breaking down annual consumption figures for domestic properties in Scotland by property and household characteristics are published alongside this report. See Annex B for details of all these tables.

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[8] Available here:www.gov.uk/government/collections/sub-national-gas-consumption-data#local-authority-data

3. Impact of energy efficiency measures

This chapter analyses the impact of installing energy efficiency measures on gas consumption for properties in England, Wales and Scotland[9,10]. The analysis compares the gas consumption in properties before and after an energy efficiency measure was installed, with the change in consumption over the same period for similar properties which have not had any measure installed in the year before, after or during the year of installation. This method is also applied to solar PV, monitoring the consumption savings in terms of metered electricity rather than gas.

Note that this analysis is only applied to measures which have been installed under government schemes, as the registration from such schemes provides the data on installations. Boilers are the exception to this, as data is also supplied by the Gas Safe Register. Data from Gas Safe is only available up to mid September 2018[11].

Impacts of measures are estimated by comparing consumption changes for an intervention group with changes in consumption for a comparator group. The intervention group contains properties which have received the energy efficiency measure, and no other measure in the year before, during or after installation as far as recorded in NEED. The comparator group contains similar properties that have no record of an energy efficiency measure installed in the year before, after or during the year of installation as defined by the intervention group. More information on the method can be found in the methodology document[12].

Headline tables summarising the results are published alongside this document. The estimates relate to energy consumption changes in 2018 for energy efficiency measures installed in 2017. The energy efficiency measures included in this analysis are:

- Cavity wall insulation (gas savings)

- Loft insulation (gas savings)

- Boiler (gas savings)

- Solid wall insulation (gas savings)

- Solar PV (electricity savings)

Also note that not all properties where a measure has been installed are included in the analysis:
- Flats, due to insufficient address information when matching meter readings, are excluded. This is because including flats matched to the wrong meter point readings may result in inaccurate estimates.

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[9] Impact of measures analysis for Scotland is completed separately to England and Wales and is detailed later in this chapter.
[10] The impact of measures analysis is presented for measures installed between mid July 2017 and mid May 2018, as the saving is calculated by looking at the difference between 2016 and 2018 gas consumption (or the equivalent "electric years").
[11] Properties that had a boiler installed after mid September 2018 may be incorrectly selected in the control group or intervention group for other measures. Analysis of the impact of this based on previous years' results indicates this has little impact on the savings estimates for boilers, likely due to the large sample size.
[12] The methodology note can be found here:
www.gov.uk/government/publications/domestic-national-energy-efficiency-data-framework-need-methodology

- Where the consumption estimates are unrealistic, extreme compared to the previous year, or are thought be estimated, the property is removed from the analysis.

Variations in estimated savings between years

The impact of measures analysis has produced estimated savings for each measure, using methodology which is not fully consistent with previous years. It is therefore important to consider each estimated saving as indicative rather than precise. There are a number of factors that are likely to contribute to variations in estimated savings:

Method and Data

- Whilst the fundamental difference in difference approach for analysis of the impact of measures has remained consistent since the creation of NEED, refinements in methodology have been made over time. The sensitivity of the estimates to these changes has not been fully assessed and therefore variation seen in estimates may be a result of methodological changes. As a result, comparisons of estimated savings between results published in different years should be done with caution.
- The number of measures installed differs year on year. In installation periods where fewer measures have been installed, the intervention and comparator group sample size will likely be smaller as a result. Estimates based on small sample sizes are likely to be less reliable.
- Increasing prevalence of measures outside of government schemes. This means that properties included in the intervention and comparator group may have had energy efficiency improvements made that have not been identified in the NEED data. All other things being equal, this would lead to a decrease in the savings found using NEED over time.

Unknown Installation Information

- The quality of installations may vary between years.
- The average size of the install may vary between years (e.g. larger solar panels can generate more electricity).
- The attributes of the installation are unknown, for example the number of walls in the property covered by wall insulation and the thickness of loft insulation.
- The brand or subtype of measure may vary between years. For example, while cavity wall insulation is considered to be a single class of intervention, in reality there are several types of cavity fill (notably bead and mineral wool)[13], which may have different impacts.

Unknown Household Information

- The results may be different for early adopters of novel measures because this self-selecting treated population may consume energy in a different pattern to general consumers.
- Any variation between the treated populations which is not known from the data. This could include age of residents and the number of children in the home.
- Changes in energy consumption behaviour which follow the installation of an energy efficiency measure and may also vary over time and between different types of household. An example is when a household chooses to heat their home to a higher

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[13]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/853563/Gas_consumption_savings_from_bead_and_mineral_wool_cavity_wall_insulation.pdf

> temperature following installation of a measure; this is a known phenomenon called comfort taking.

There are a number of possible reasons for variation in estimated savings between years (see the blue box above). Estimated savings cannot be attributed to specific casual factors and as such definitive explanations for increases or decreases in estimated savings seen for each measure are not offered. These factors should also be borne in mind when comparing savings over time, and when considering the distribution of savings in the data.

All headline figures in this report are weighted, meaning that savings have been adjusted to be representative of the complete housing stock (excluding flats) rather than just the properties which have had the measure installed in the year under consideration.

Impact of measures installed in England and Wales

Single measures

Figure 3.1 shows the weighted median[14] savings in 2018 following the installation of measures installed in 2017. Solid wall insulation has the highest gas saving with a median saving of 18.9 per cent. Loft insulation yielded the lowest gas saving with a median saving of 4.2 per cent. These estimates can be found in the published tables "Headline impact of measures: England and Wales, 2017".

Figure 3.1: Median and mean gas savings in 2018 for measures installed in 2017, England and Wales (savings are for electricity for Solar PV)

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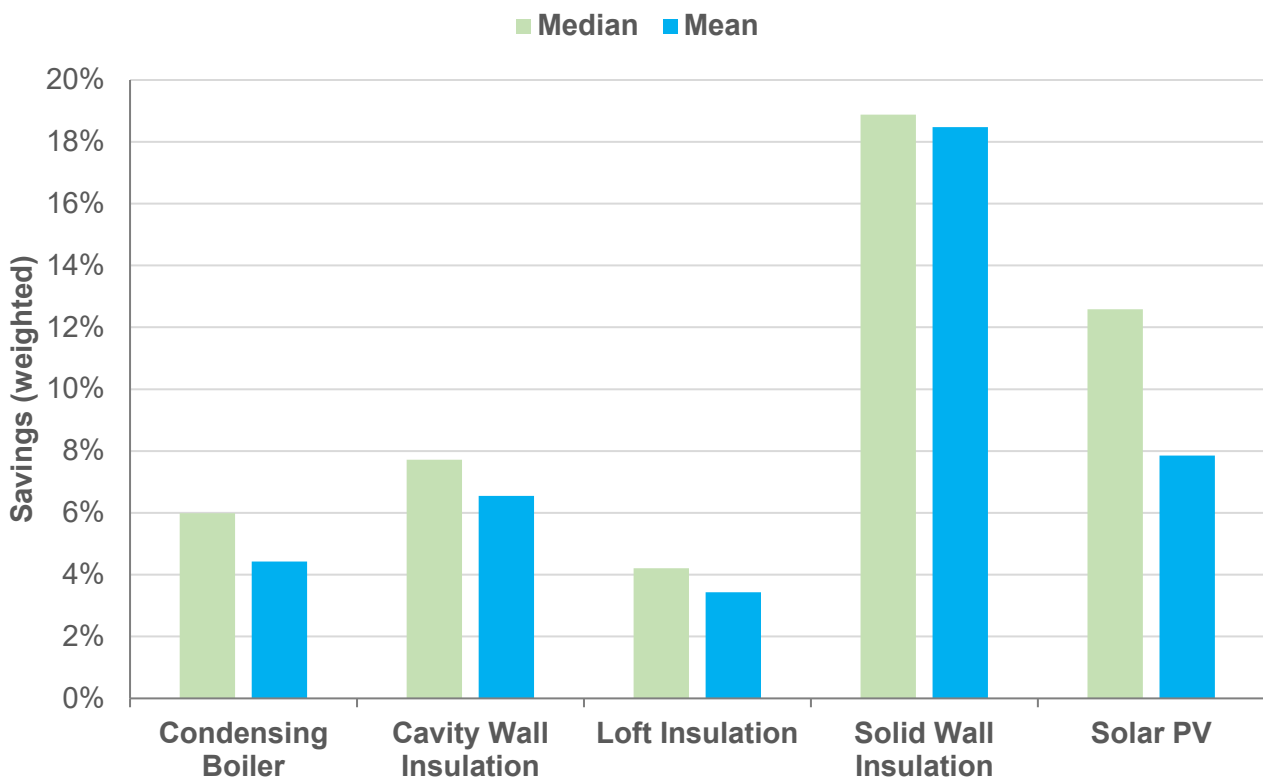
[14] The median is a more appropriate measure as the distribution of savings can be skewed.

Due to comfort taking these figures may underestimate of the real energy efficiency gains of the measures (see detail below).

The impact of solar PV only reflects change in metered electricity consumption. Some electricity will also be generated and consumed on-site, and some exported to the electricity grid, both of which are unknown (see detail below).

Comfort taking

A known phenomenon when properties become more energy efficient is comfort taking. This is when, rather than heating their home to the same temperature after the install, the resident takes advantage of the more energy efficient home by heating the home to a higher temperature than before the install, or "taking comfort". Homes which were adequately heated prior to the installation of a measure can be expected to take less comfort than under heated homes. Lower comfort taking means higher metered savings, as residents decide on a balance between heating their homes and saving money. The impact of measures analysis using NEED is based on metered savings and does not capture the temperature of homes. Therefore, the real efficiency gains resulting from installing an energy efficiency measure may be higher than the figures presented in this analysis suggest.

A similar effect can be expected with the installation of solar PV. The installation of solar PV may result in less electricity being drawn from the grid (which is detectable in NEED). However, this fall in electricity use from the grid may be partially offset by the resident taking advantage of the energy generated on-site and increasing their overall electricity use following the installation of solar PV. As this is not taken into account in the analysis, the true saving resulting from installing a solar PV may be higher than the figures presented in this analysis suggest.


Combinations of measures

Where a large enough number of properties have installed multiple measures in a single year the impact of a combination of measures can be calculated. These are included in the published table "Headline impact of measures: England and Wales, 2017".

For measures installed in 2017 the combination of measures with the greatest impact on consumption savings in 2018 was cavity wall insulation and loft insulation, with a weighted median saving of 14.8 per cent. Figure 3.2 below shows the savings from combinations of two measures in 2017.

The installation of both a boiler and heat controls appears to yield a lower energy saving than just installing a boiler, however this should be interpreted with care. The characteristics of this intervention group may be different to those that installed a boiler without heating controls. There is some research to indicate that this may be related to the usability of heating controls and householder comfort taking[15].

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[15] www.gov.uk/government/publications/how-heating-controls-affect-domestic-energy-demand-a-rapid-evidence-assessment

Figure 3.2: Median and mean gas savings from combinations of two measures installed in 2017 (weighted)
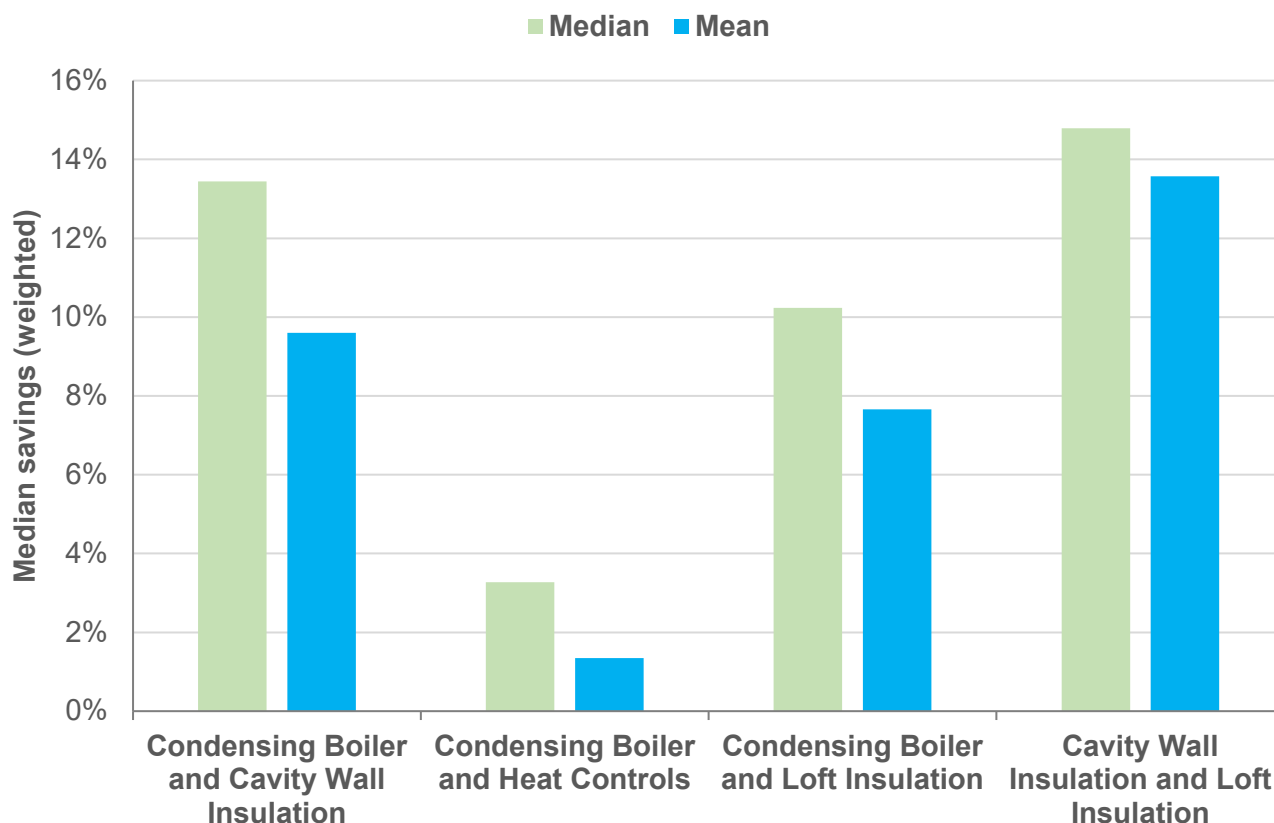
Impact of measures in the years following installations

The NEED 2019 publication introduced estimates of the impact of measures over longer periods of time. Estimates of savings over time for measures installed in 2011, 2012 and 2013 are published alongside this report in the table "Impact of measures in years following installation". The method used for these estimates was the same as that used for the other impact of measures analyses, except that instead of comparing the year before installation to the year after, the year before is compared to one or more years after. More detail on this is given in the methodology note[16] which accompanies this report.

Note that because the savings are based on metered gas use, which is affected by many factors not accounted for in the methodology, some fluctuation in the results is to be expected which can be seen to varying degrees in the figures for all gas measures. Therefore, for savings in the years following installation, the general trend is more informative than the savings in each year.

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[16] The methodology note can be found here:
www.gov.uk/government/publications/domestic-national-energy-efficiency-data-framework-need-methodology

Figure 3.3 shows the impact of single measures installed in 2011 for the seven years after installation, relative to the first year after installation. Condensing boiler and loft insulation saw the largest declines, both seeing a reduction in gas savings of just over a fifth between the first and seventh years after installation.

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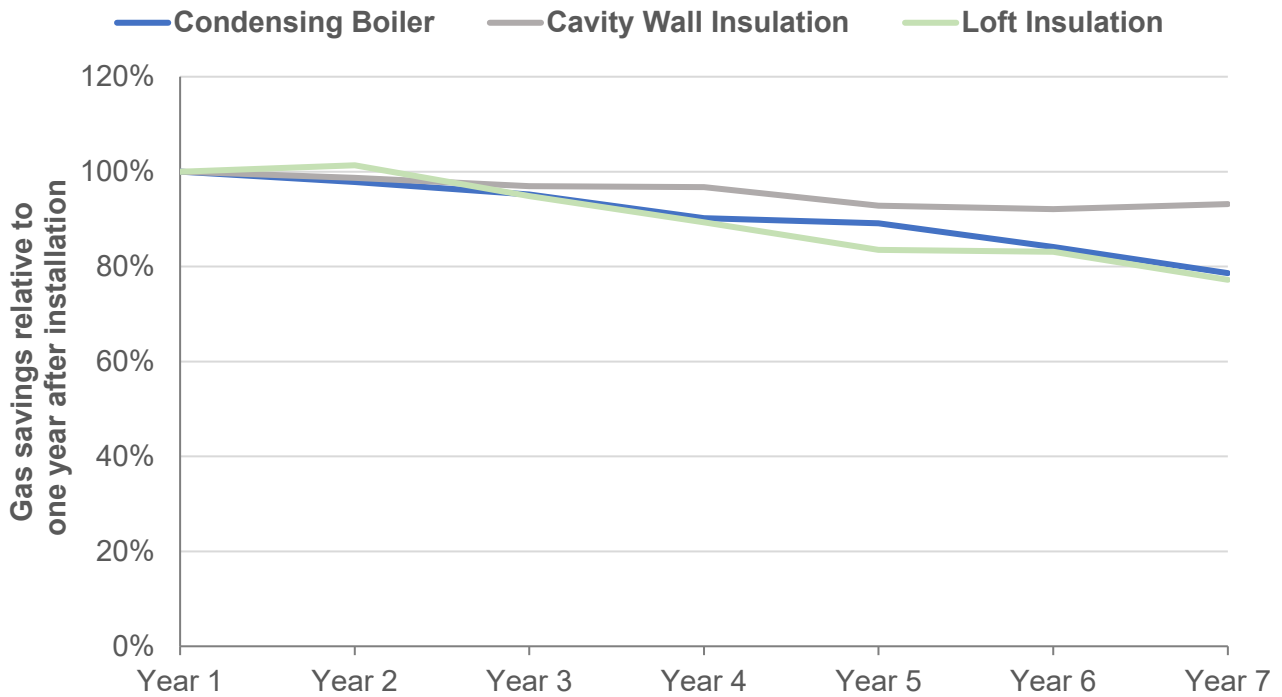**Figure 3.3: Impacts of measures installed in 2011, with savings shown relative to savings one year after installation**

Figure 3.4 shows the median impact of measures averaged across installations in 2011, 2012 and 2013 for the five years after installation. It mirrors a similar trend to that seen in Figure 3.3. Reasons for the reduction in savings over time could be attributed to the reduction in the performance of the measure, increased comfort taking or other factors not identified in the analysis.

Figure 3.4: Impact of measures averaged across installations in 2011, 2012 and 2013, with savings shown relative to savings one year after installation
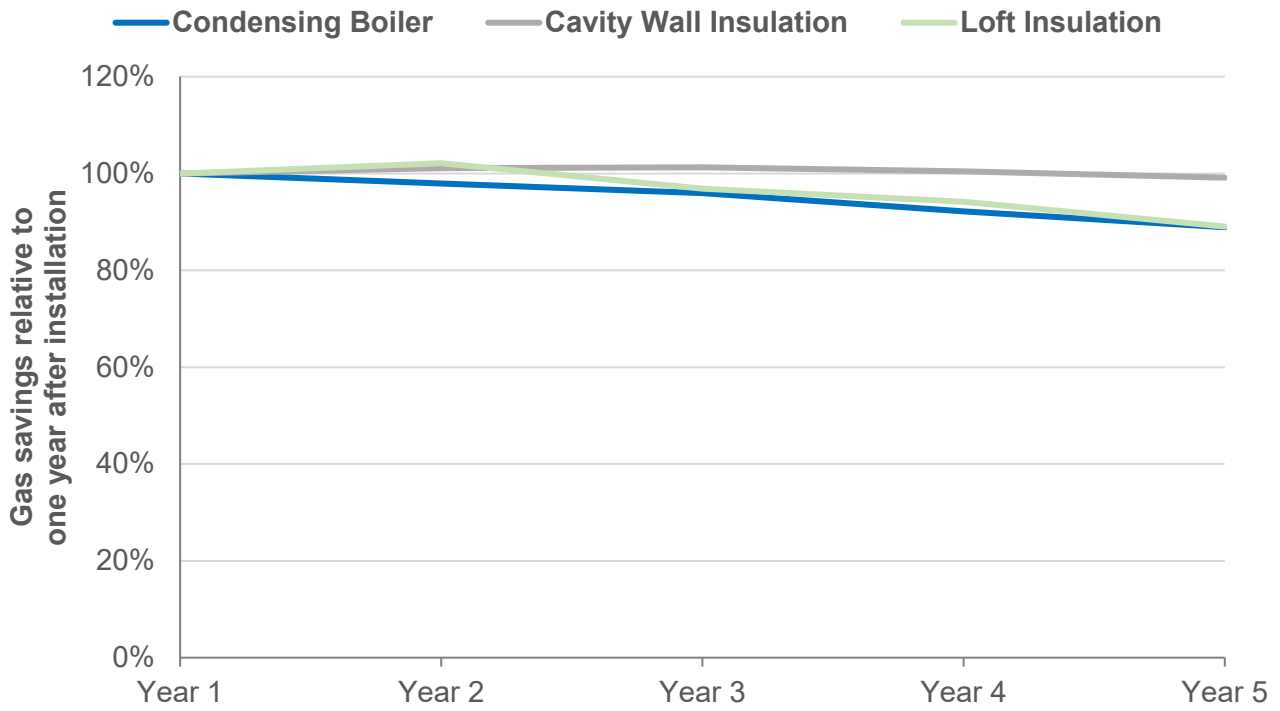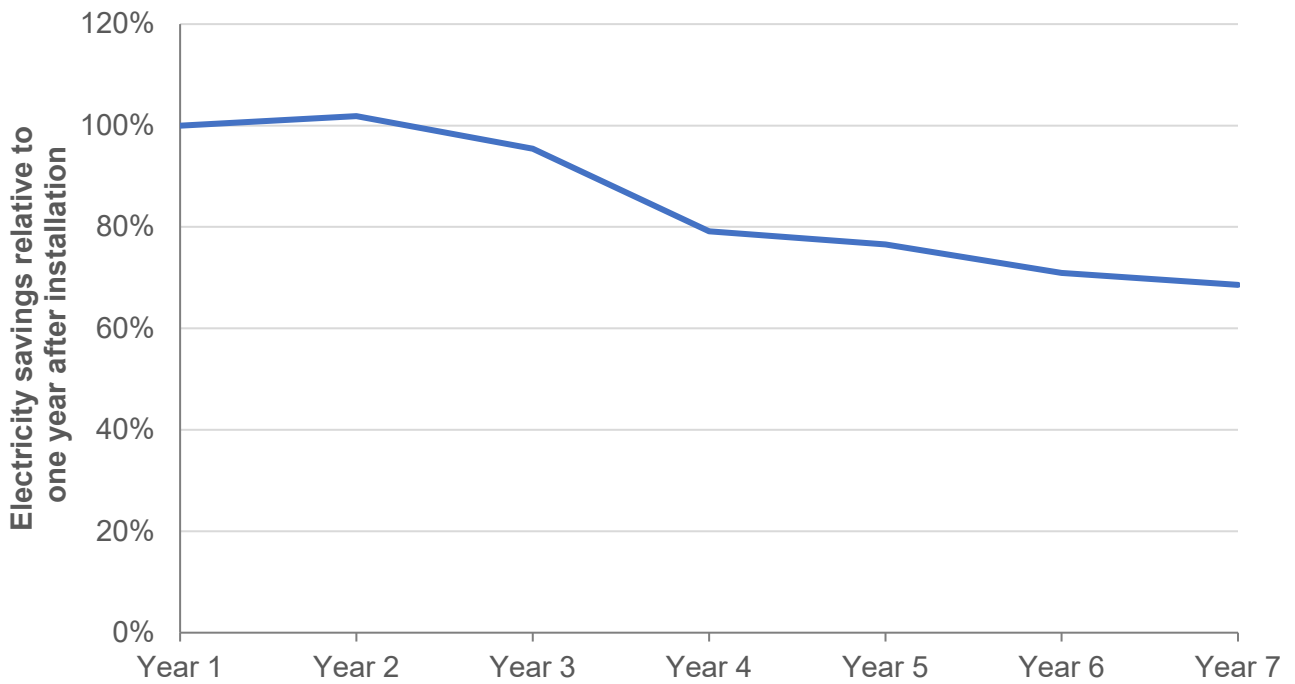

Figure 3.5: Impact of solar PV installed in 2011, with savings shown relative to savings one year after installation

Impacts of solar PV over time are shown in Figure 3.5. Impacts of solar PV on electricity consumption savings in the years following reduce more rapidly than gas consumption savings for boiler, cavity wall insulation and loft insulation. Sources indicate that degradation of a measure is likely to be below 1 per cent per year, however this can be expected to vary between installations[17]. It is therefore likely that, in this case, the reduction in metered savings over time is too large to be attributed to physical degradation of the measure alone.

Impact of measures installed in Scotland

The following section sets out the results for the impact of measures analysis in Scottish domestic properties. Apart from being weighted and paired by slightly different property and household characteristics[18], the method for Scottish properties is identical to that used for properties in England and Wales. Tables are published alongside this document giving estimated savings for Scottish properties ("Headline impact of measures: Scotland, 2017").

Single measures

Estimates for the median and mean gas savings from installing various measures are shown in Figure 3.6 below, with the exception of solar panels, for which electricity savings are shown. Solar PV can be seen to yield the highest savings, with an estimated median electricity saving of 13.7%, followed by solid wall insulation which yields an estimated median gas saving of 12.1%.

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[17] For example: Compendium of photovoltaic degradation rates, Jordan et al, 2016, https://onlinelibrary.wiley.com/doi/abs/10.1002/pip.2744
[18] Property characteristic data is supplied by the Scottish Assessor for Scottish properties, rather than the Valuation Office Agency for English and Welsh properties

Figure 3.6: Median and mean gas savings in 2017 for measures installed in 2017, Scotland (savings are for electricity for Solar PV)
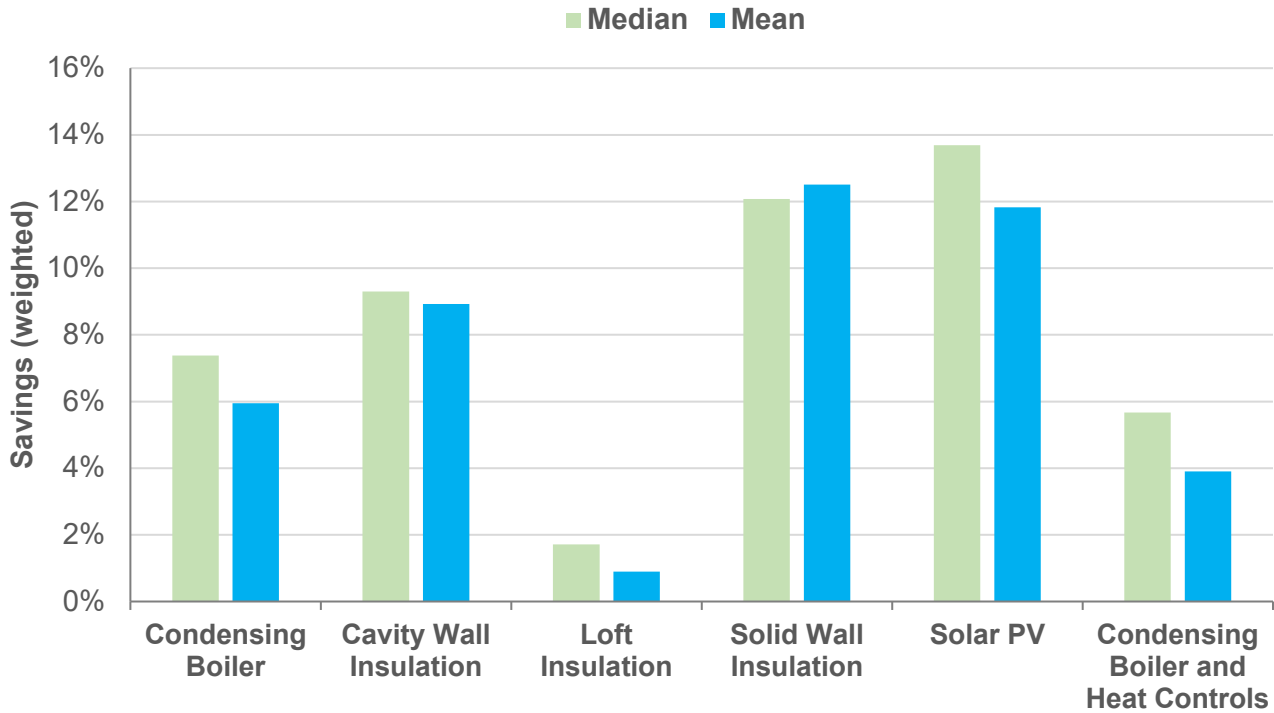
Combinations of measures

For measures installed in 2017 only one combination of measures met the required sample size for publication (200 properties) following the removal of ineligible properties as detailed in the methodology. This combination was boiler and heating controls (included in Figure 3.6 above) which had an estimated median gas saving of 5.7%. The estimates showed higher energy savings when installing a boiler alone than when installing both a boiler and heating controls. This is in line with the results for England and Wales.

Further Information

Supporting data tables

All data tables associated with this release can be found in Annex B at:
https://www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2020

Future updates to these statistics

The next release of these statistics, covering 2019 data, is planned for publication in June 2021. Sub-national consumption statistics for 2019 will be published in December 2020.

Related statistics

Sub-national electricity consumption statistics
Summary statistics of domestic and non-domestic electricity consumption at different geographic levels from local authority to postcode level.
www.gov.uk/government/collections/sub-national-electricity-consumption-data

Sub-national gas consumption statistics
Summary statistics of domestic and non-domestic electricity consumption at different geographic levels from local authority to postcode level at different geographic levels from local authority to postcode level.
www.gov.uk/government/collections/sub-national-gas-consumption-data

Sub-national total final energy consumption statistics
Summary statistics of domestic and non-domestic consumption of all fuels reported on by BEIS at local authority level.
www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level

Housing energy efficiency statistics
Monthly statistics on installations under the Energy Company Obligation (and previous schemes.
www.gov.uk/government/collections/household-energy-efficiency-national-statistics

Feed-in tariff statistics
Monthly statistics on installations under the Feed-in Tariff.
www.gov.uk/government/collections/feed-in-tariff-statistics

Revisions policy

The BEIS statistical revisions policy[19] sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority Code of Practice for Statistics[20].

User engagement

Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed and should be sent to: energyefficiency.stats@beis.gov.uk

The BEIS statement on statistical public engagement and data standards[21] sets out the department's commitments on public engagement and data standards as outlined by the Code of Practice for Statistics.

National Statistics designation

National Statistics status means that our statistics meet the highest standards of trustworthiness, quality, and public value, and it is our responsibility to maintain compliance with these standards.

The continued designation of these statistics as National Statistics was confirmed in February 2015 following a compliance check by the Office for Statistics Regulation. The statistics last underwent a full assessment against the Code of Practice for Statistics in 2014[22].

Pre-release access to statistics

Some ministers and officials receive access to these statistics up to 24 hours before release. Details of the arrangements for doing this and a list of the ministers and officials that receive pre-release access to these statistics can be found in the BEIS statement of compliance[23] with the Pre-Release Access to Official Statistics Order 2008.

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[19] www.gov.uk/government/publications/beis-standards-for-official-statistics/statistical-revisions-policy
[20] www.statisticsauthority.gov.uk/code-of-practice
[21] www.gov.uk/government/publications/beis-standards-for-official-statistics/statistical-public-engagement-and-data-standards
[22] www.statisticsauthority.gov.uk/publication/statistics-on-energy-and-climate-change/
[23] www.gov.uk/government/publications/beis-standards-for-official-statistics/pre-release-access-to-official-statistics-order-2008-statement-of-compliance